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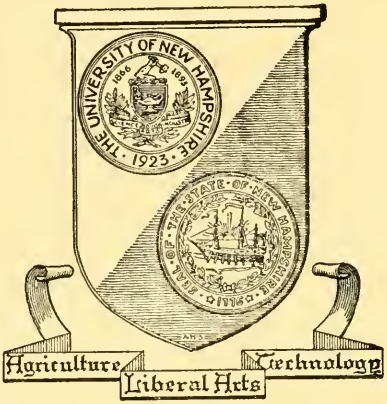

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PURCHASING FERTILIZERS in New Hampshire

By L. A. Dougherty

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UNIVERSITY OF NEW HAMPSHIRE
DURHAM, N. H.

PURCHASING FERTILIZERS IN NEW HAMPSHIRE

By Lawrence A. Dougherty

FERTILIZER PURCHASES constitute an important item among the cash production costs of New Hampshire farmers. Such purchases are important not only because they are often large in amount but also because they may materially increase profits realized in an area where most soils need lime and fertilizer applications.

This study was undertaken to determine some of the practices in purchasing and to indicate possible ways of making savings in such purchases.

AMOUNTS OF FERTILIZER AND LIME USED

In the 20-year period ending in 1943, annual fertilizer sales have ranged from 10,000 tons, in 1931, to 29,000 tons, in 1943. Large increases in the amounts of lime used have also occurred in the last few years. This may be accounted for in part by government subsidies and by a more general knowledge covering the benefits of its use. An average of 30,342 tons was used in the 1940-1942 periods as compared with an average of 3700 tons in the three-year period, nine years earlier. *(See Appendix, Tables A-1 and A-2.)*

Fertilizer from Government and Private Sources

An increasing proportion of the lime and fertilizer has been obtained by farmers from government sources. *(See Figure 1.)* This is due to the fact that the Agricultural Adjustment Administration has furnished such fertilizer at a very low direct cash cost as an inducement for farmers to follow certain practices of soil conservation.

The percentage of the fertilizers coming through government agencies, based on available reports, has changed from 47 per cent for the 1939-1940 season to 69 per cent in the 1942-1943 season. The relative amount of mixed fertilizers sold as compared to materials has also increased, ranging from one-third of the total in 1940 and 1941 to about two-thirds of the total in 1943.

Tonnage and Sources of Superphosphates

In the three-year period, 1940-1942, the amount of superphosphates used in New Hampshire ranged from 13,486 tons to 14,556 tons (20 per cent basis), but dropped under 8000 in 1943. In the four-year period, 1940-1943, the average tonnage was 12,443, 87 per cent of which came through government agencies and 13 per cent from private sources.* *(See Figure 2.)* The amounts purchased in each county, in 1943, are

* Based on government reports.

given in *Appendix, Table A-5.* The average quantity taken in the conservation program per operator, in 1943, varied from .9 ton in Carroll county to 1.7 tons in Coos county, with an average for the state of 1.2 tons per farm operator.

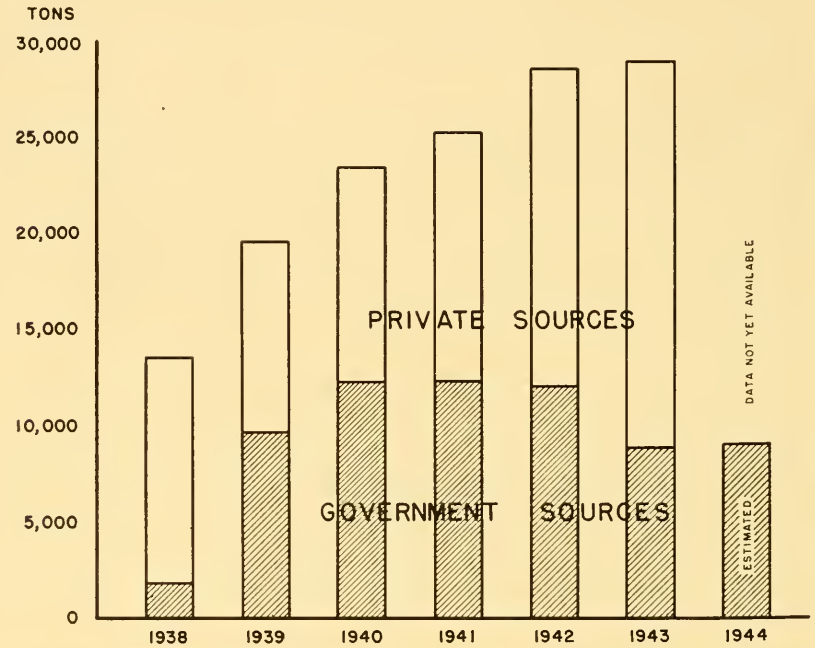

Figure 1.—Fertilizer consumption in New Hampshire from government and private sources

Superphosphate Purchases Under AAA, 1942-1944

In the three-year period, 1942-1944, from 32 per cent to 56 per cent of all farmers obtained superphosphates under the conservation program. This is a high level of participation, and an average of almost 41 per cent of all farmers did participate. *(See Appendix, Table A-3.)* Participation averaged highest in Carroll county and lowest in Strafford county. *(See Figure 3.)* In 1943, Grafton county used the most superphosphate (1364 tons or 20.8 per cent of the state total); Strafford county used the least (309 tons or 4.7 per cent of the state total).

Lime Used In New Hampshire

The amount of lime reported as used in New Hampshire amounted to 27,320 tons, in 1942, or more than six times that used 10 years earlier. Complete figures are not yet available for 1943 and 1944, but the estimated amount purchased under the Soil Conservation program alone, in 1944, is estimated at almost 35,000 tons. It is quite evident that use of lime has been greatly stimulated by the Soil Conservation program. *(See Figure 4 and Appendix, Table A-4.)*

Hillsborough county used the most (2623 tons) and Sullivan county the smallest amount (538 tons) of lime under the 1943 Soil Conservation program. The average amount used per operator was 3.3 tons and ranged from 2.7 tons in Belknap county to 4 tons in Coos county. *(See Appendix, Table A-5.)* The average tonnage a year for the 1938-1943 period for each county is shown in *Figure 5*.

Reports from 195 producers* in three counties (Coos, Hillsborough, and Rockingham) indicated that 76 per cent of the farmers used AAA lime and took 68 per cent of their total tonnage from AAA. An average of 6.1 tons was used per farm. Those who reported acres treated (140 farms) showed 1.2 tons used an acre and treatment of an average of 4.1 acres a farm. *(See Appendix, Table A-6.)*

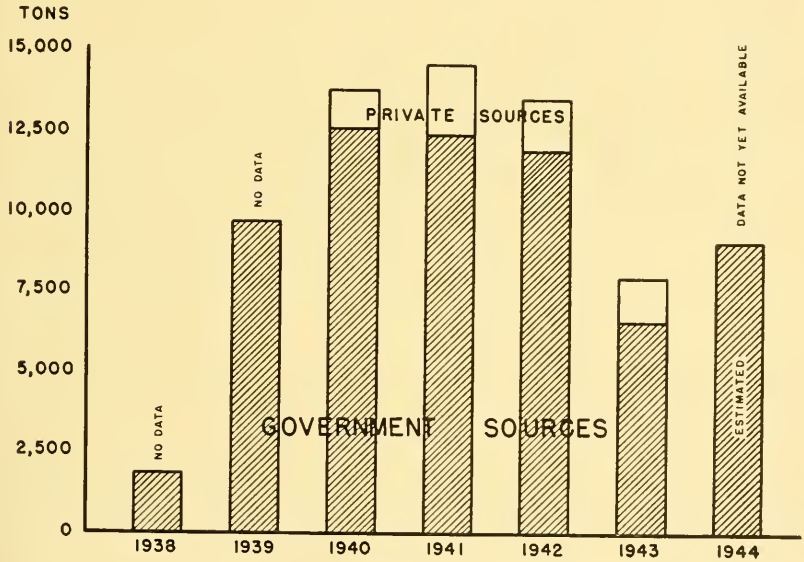

Figure 2.—Superphosphates consumed in New Hampshire
Tons in terms of 20 per cent superphosphate

Mixed Fertilizer Furnished by AAA

In 1943, AAA furnished fertilizer of 0-14-14 analysis to New Hampshire farmers. The 1943 program may be summarized as follow:

No. operators	Tons received	Deduct. per ton	Average Assoc. cost per ton	Sum of deductions
2624	2358	$31.06	$3.07	$73,252

This deduction of $31.06 is considerably less than the average price paid for 0-14-14 from dealers. The average quotation of five companies for southern New Hampshire was $40.51 at warehouse (included delivery in certain cases). One company quoted a car door price of $35.80.

* Only those who took cash payments in addition to conservation materials are included in this tabulation.

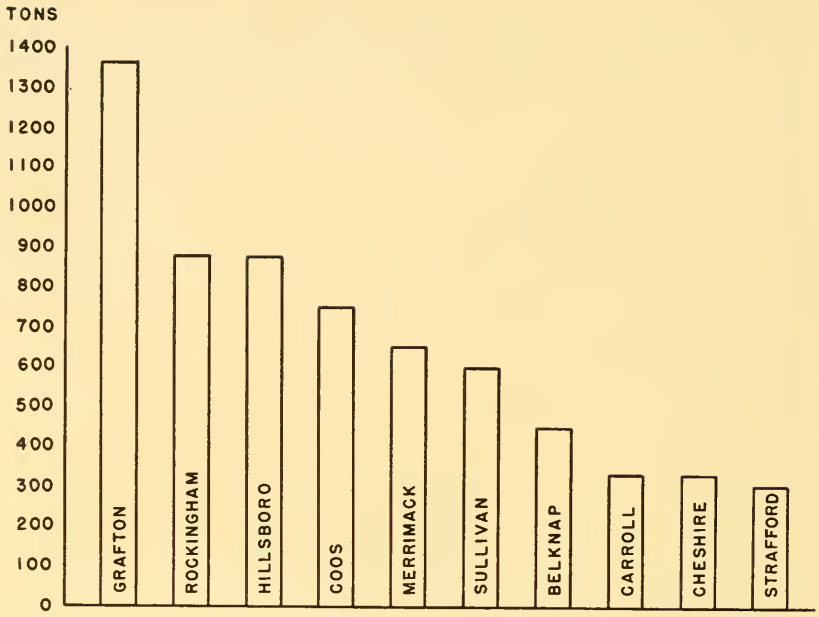

Figure 3.—Superphosphates furnished New Hampshire counties by AAA - 1943

The actual average, direct cash cost to the farmer of the 0-14-14 from AAA was $3.07 a ton ($3.00 southern New Hampshire and $3.20 northern New Hampshire).

Size of Fertilizer Purchases Made by Farmers

The majority of New Hampshire farmers buy less than five tons of fertilizer per year. Reports from 137 farmers who bought 338 tons in representative areas, in 1941, indicated that 86 per cent bought less than five tons per year. Over half hauled their own.

Table 1.—Fertilizer Purchases by N. H. Farmers in 1941

	Size of purchases made by farmers				
	Under one ton	1-5 tons	5-10 tons	10 tons & over	Total
% farms in each size group	44	42	7	7	100
% tonnage in each size group	9.7	45.7	13.8	30.8	100
% farmers hauling own in each size group	57	56	60	67	57
% tonnage hauled by farmers in each group	57	60	50	68	60
% season's supply delivered at one time	72	90	99	73	88

In data obtained in 1943 from several hundred farmers who took both materials and cash payments under the Soil Conservation program, it was found that almost two-thirds of the farmers bought superphosphate and 0-14-14 in lots of one ton or more, but under five tons.

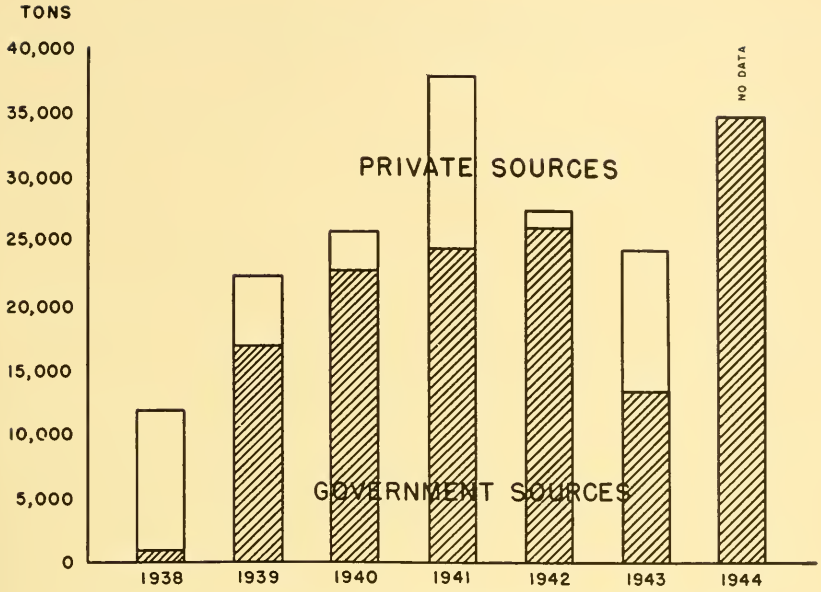

Figure 4.—Lime used on New Hampshire farms 1938-1944

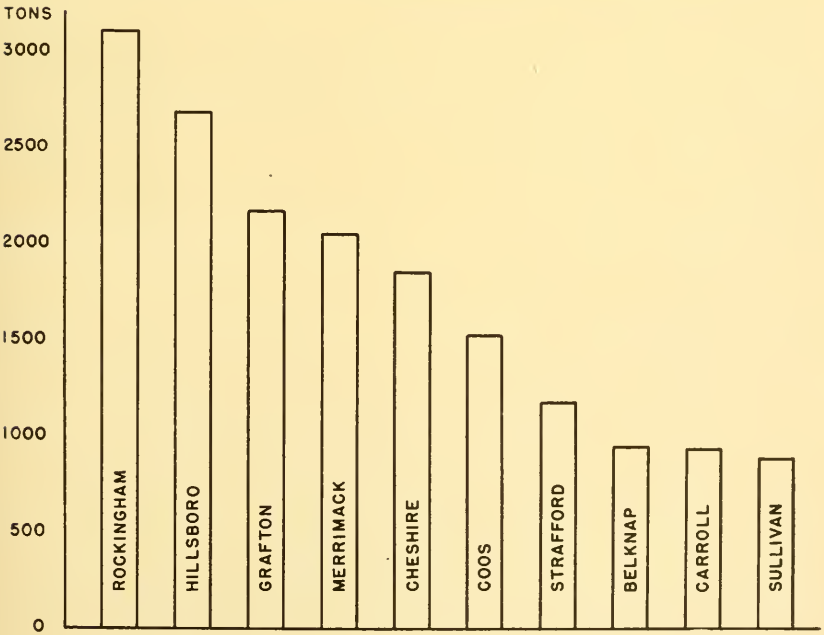

Figure 5.—Lime furnished New Hampshire counties by AAA

Average tonnage per year for 1938-1943 period

Table 2.—Size of Fertilizer Purchases of Certain Farmers in 1943 (Superphosphate, potash, and 0-14-14, three counties)

	Superphosphate		Potash		0-14-14	
	(farmers')	(tonnage)	(farmers')	(tonnage)	(farmers')	(tonnage)
Under one ton	29% bought	9%	53% bought	12%	34% bought	13%
One to five tons	65% bought	73%	42% bought	61%	65% bought	71%
Five tons or over	6% bought	18%	5% bought	27%	1% bought	16%

About one-third of the farmers bought under a ton of these fertilizers but they accounted for a relatively small percentage of the total tonnage. **See Table 2.** A more detailed tabulation is shown in **Appendix, Table A-7.**

FERTILIZER ANALYSES AVAILABLE TO FARMERS

Changes in Fertilizer Analyses from Year to Year

A large number of mixed fertilizers of different analyses are sold in New Hampshire, and offerings change considerably from year to year. This may be explained in part by the availability of materials, their relative costs, changes in recommendations for crops, and probably also because companies wish to carry some non-competitive analyses. From the standpoint of the farmer a more limited number of analyses and fewer changes from year to year would seem desirable. The number of different analyses has been reduced in this war period and this was especially noticeable in the 1943 and 1944 season. *(See Table 3.)*

Competitive and Noncompetitive Analyses*

Many fertilizer analyses are offered by but one company in any given year. Price lists of eight different companies which handle most of the fertilizer in New Hampshire were checked over a six-year period. Of 67 different analyses of mixed fertilizer which were checked in the 1938-1939 to 1943-1944 period:

28 were offered in but one year
6 were offered for two years
7 were offered for three years
16 were offered for four years
10 were offered for five years
0 were offered for six years

In reviewing the offerings of these eight companies over the six-year period, it was found that the listings were about as follows:

47% of the offerings were quoted by but one company
13% of the offerings were quoted by two companies
14% of the offerings were quoted by three companies
9% of the offerings were quoted by four companies
6% of the offerings were quoted by five companies
4% of the offerings were quoted by six companies
5% of the offerings were quoted by seven companies
2% of the offerings were quoted by eight companies

Thus almost half of the listings were noncompetitive in that they were offered by but one company over the six-year period.

* The term analysis, as used here, refers to the formula naming chemical content as 5-8-7 (5 per cent nitrogen, 8 per cent available phosphoric acid, and 7 per cent water soluble potash).

Table 3.—Number of Different Analyses Reported As Sold in New Hampshire Over a Four-Year Period*

	1939-40	1940-41	1941-42	1942-43
No. mixed fertilizer analyses reported	20	45	45	36
No. reported:	all four years	for three years	for two years	one year only
	19	13	13	22

* From data furnished by Ford Prince, Agricultural Experiment Station.

Mixed Fertilizer Analyses Sold in Largest Quantities

During the four years, 1940-1943, more of the 5-8-7 analysis was sold than of any other. About 21 per cent of the number of analyses, for which sales were 1000 tons or more in that period, accounted for 84 per cent of all sales of mixed fertilizer in the state. *(See Figure 6.)*

Sales of Mixed Fertilizers of Low and High Analyses

Sixty-eight per cent of the number of analyses of mixed fertilizers for which sales were reported in the state in the 1940-1943 period contained less than 25 units of chemicals and they accounted for 76 per cent of the total tonnage sold in that period. Seventeen per cent of the number of analyses offered contained 35 units or more, and they accounted for 14 per cent of total tonnage. The number of analyses grouped according to units of chemicals contained therein and the tonnage sold are shown in *Table 4.*

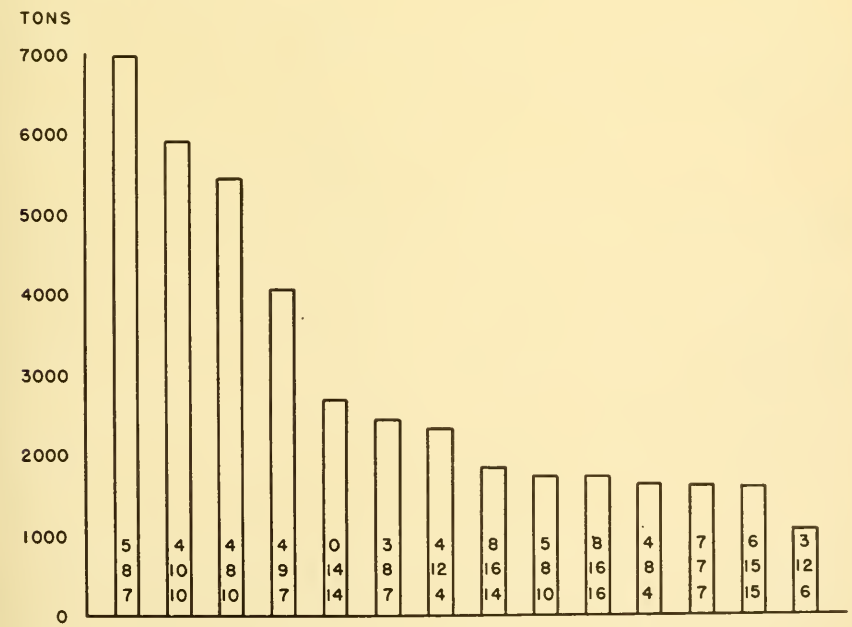

Figure 6.—Sales of mixed fertilizers in New Hampshire
Largest selling analyses for the four-year period of 1940-1943

Table 4.—Sales of Mixed Fertilizers of Different Analyses
New Hampshire — four years (1940-1943)

No. chem. units*	Under 20	20-24	25-29	30-34	35-39	40 or over
No. analyses (% total)	35	33	6	9	5	12
Tonnage (% total)	13	63	8	2	7	7

Above figures based on 66 analyses and total of 48,846 tons

* Pounds of nitrogen, available phosphoric acid, and/ or water soluble potash in 100 pounds of fertilizer.

FERTILIZER ANALYSES GUARANTEES vs. INSPECTION DETERMINATIONS

Fertilizer inspections are made each year by the New Hampshire Agricultural Experiment Station for the State Department of Agriculture. An annual report is issued which is available to all farmers upon request. Thus, any farmer may review the findings on all brands and analyses. Such a review should be of value in considering purchases.

On the average, guarantees have been more than met. For the eight years 1936-1943, covering inspections of complete fertilizers, the average amounts of chemicals as shown by determinations exceeded guarantees as follows: nitrogen + 1.4 per cent, available phosphoric acid + 2.4 per cent, water soluble potash + 2.2 per cent. *(See Table 5-A.)*

However, in 46 per cent of these cases, guarantees were not fully met. Approximately 33 per cent were deficient in one chemical, 12 per cent in two chemicals, and one per cent in three chemicals. *(See Table 5-B covering each of the eight years.)*

Table 5-A.—Fertilizer Guarantees vs. Findings from Inspections
Complete Fertilizers — N. H. 1936-1943
(Based on data from N. H. Agr. Exper. Sta. Reports)

Year	Number brands* included	Averages of analyses guarantees			Findings exceeded guarantees by percentages shown		
		Nitrogen per cent	Avail. phos. acid per cent	Water sol. potash per cent	Nitrogen	Avail. phos. acid	Water sol. potash
1936	82	5.22	9.50	7.55	1.1	5.	.6
1937	76	5.22	9.49	7.47	.8	3.5	.2
1938	76	5.16	9.61	7.66	.8	1.3	.7
1939	84	5.54	10.12	8.46	1.4	1.2	2.9
1940	87	5.43	9.93	7.98	1.8	.7	4.
1941	86	5.62	10.02	8.37	1.8	3.3	2.7
1942	58	5.41	9.45	8.91	.4	2.9	3.4
1943	45	3.78	10.38	7.98	5.2	3.1	2.6
8-year Total	594	5.3	10.	8.1	1.4	2.4	2.2

* Brand refers to a specific analysis of a given company. That is, 5-8-7 and 5-10-10 offered by Company A and B would be two different brands.

Table 5-B.—Fertilizer Analyses Guarantees vs. Inspection Determinations
Complete Fertilizers — N. H., 1936-1943
(Based on data from N. H. Agr. Exper. Sta. Reports)

Year	No. brands involved	fully met guarantees	Percentage of brands which: were deficient in number constituents shown* one	two	three
1936	82	41	38	20	1
1937	76	48	34	18	0
1938	76	55	32	10	2
1939	84	54	35	9	2
1940	87	58	33	8	1
1941	86	55	38	7	0
1942	58	57	34	9	0
1943	45	71	13	16	0
All	594	54	33	12	1

* Refers to deficiencies in nitrogen, water soluble potash, and available phosphoric acid.

Table 5-C.—Fertilizer Guarantees vs. Inspection Determinations
Complete Fertilizers — N. H. — Averages for Two Years Ending 1942-1943
Extreme variations of analyses findings from guarantees

Company with:	Per cent averages varied from guarantees: Nitrogen Number brands	per cent	Avail. phos. acid Number brands	per cent	Water sol. potash Number brands	per cent
Best record	1	+ 18.	1	+ 14.3	2	+ 8.6
Poorest record	5	— 1.6	5	— 3.4	7	— .2
Average (all analyses)	103	+ 2.1	103	+ 2.9	103	+ 3.1

Deficiencies in Chemical Content of Fertilizers Sold in New Hampshire, 1936-1943

The New Hampshire annual reports on fertilizers have given the number of cases in each year in which the chemicals found did not meet the guarantees. These were given for nitrogen, available phosphoric acid, and water soluble potash. The average of these deficiencies was given but that analysis with the greatest deficiency was excluded from the average in each case. In *Table 6* these were summarized, but averages are given here for all those which were deficient. During this period the average of the deficiencies ranged from .18 to .25 pounds of nitrogen, .29 to .91 pounds of available phosphoric acid, and .36 to 1.14 pounds of water soluble potash per 100 pounds of fertilizer. These figures differ from those in previous tables in that they include only those samples which were found deficient for all brands analyzed.

A rather large percentage of the sample did not fully meet the guarantees. The number of samples showing deficiencies ranged from approximately 27 per cent, in 1943, to 51 per cent, in 1936. For that eight-year period (1936-1943) approximately 19 per cent were deficient in nitrogen, 15 per cent were deficient in available phosphoric acid, and 15 per cent were deficient in water soluble potash.

Table 6.—Deficiencies in Chemical Content of Fertilizers Inspected in New Hampshire in the Eight-Year Period 1936-1943

Year	No. brands analyzed	Number below guarantees	Number and average of the deficiencies in terms of lbs. of chemicals in 100 lbs. of fertilizer					
			Total nitrogen		Avail. phos. acid		Water sol. potash	
			No. def.	Ave. def.	No. def.	Ave. def.	No. def.	Ave. def.
1936	112	57	31	.18	12	.46	32	.36
1937	103	42	25	.24	9	.29	22	.61
1938	106	42	22	.19	18	.52	15	1.14
1939	109	43	18	.22	22	.56	12	.45
1940	116	42	15	.20	29	.45	6	.70
1941	108	44	19	.25	11	.69	19	.79
1942	84	30	15	.19	11	.91	8	.84
1943	67	18	11	.22	6	.42	10	.54
Total	805	318						

Variation in Records of Individual Companies in Meeting Fertilizer Guarantees

Some companies show much better records than others. Data covering inspections of complete fertilizers over the eight-year period (1936-1943) for those nine companies for which inspections were made in seven or eight years show a range from 29 to 82 per cent in the number of

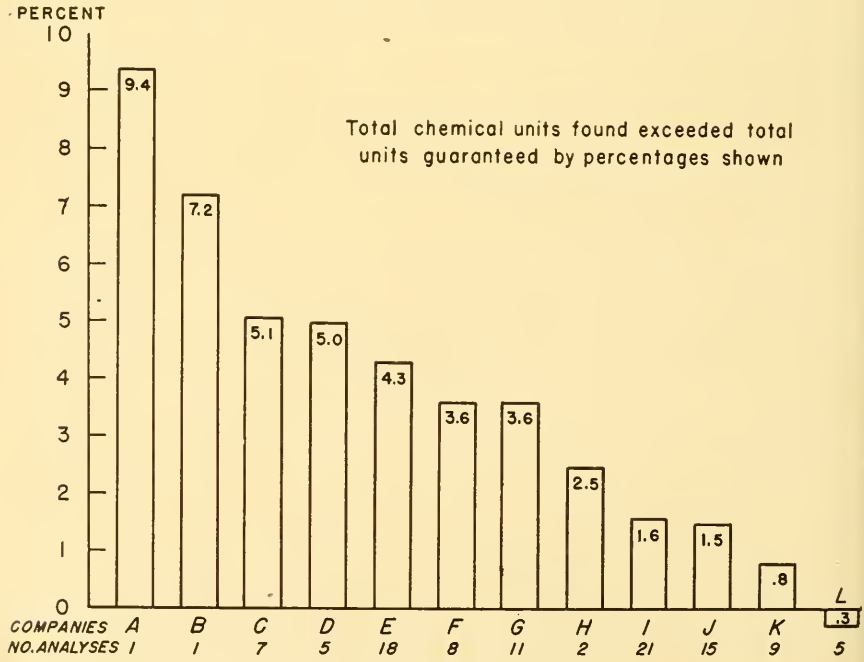

Figure 7.—Total chemical units in complete fertilizers guarantees vs. determinations - N. H., 1942 and 1943

samples fully meeting guarantees. *(See Appendix, Table A-8 for complete summary.)*

The extent of the variations from guarantees for individual companies is shown in *Appendix, Table A-10* for a two-year period (1942-1943). From a purchasing standpoint, this is more important. Those companies with the poorest records show deficiencies of but 1.6 per cent in nitrogen, 3.4 per cent in available phosphoric acid, and .2 of 1 per cent in water soluble potash, while the companies with the best records show an excess over guarantee of 18 per cent for nitrogen, 14.3 per cent for available phosphoric acid, and 8.6 per cent for water soluble potash. *(See Appendix, Table A-9.)*

A comparison of guarantees and determinations can also be made for units of the three chemicals. Determinations in terms of total chemical units for all complete fertilizers of 12 companies during the two-year period ending 1942-1943 ranged from .3 per cent below guarantees to 9.4 per cent above the guarantees. Thus, only one company in 12 gave less in terms of total chemical units than guaranteed. *(See Figure 7 and Appendix, Table A-10.)*

USE OF LOW AND HIGH ANALYSIS FERTILIZERS

Certain advantages exist in the use of either low- or high-analysis fertilizers. Greater care in application may need to be exercised in the case of high-analysis products. However, the savings in lower cost and in fewer tons to be handled in the high-analysis fertilizers appear to the writer to far outweigh any disadvantages. Although considerable emphasis has been placed on those advantages, the progress in that direction seems to be very slow. As previously indicated, about three-fourths of our total tonnage includes fertilizers with fewer than 25 units of chemicals.

Comparisons in this discussion are made only on a basis of the guaranteed analysis, but farmers should bear in mind that other factors such as organic content or inclusion of chemicals other than nitrogen, phosphoric acid, and potash, should also be considered in making purchases.

Cost of Chemicals in Fertilizers of Various Analyses

Considerable variation exists in the cost of chemicals in fertilizers of different analyses. Comparison has been made between the costs of chemicals in mixed fertilizers with their cost if purchased separately. *(See Figure 8.)* Low-analysis fertilizers are usually relatively more costly since it costs money to ship and handle filler. The source of the chemical, the amount of organic material included, and the presence of other chemicals are also considerations in determining relative values. In the comparisons made here, however, we are considering costs of nitrogen, available phosphoric acid, and potash.

Cash Savings in Purchase of High-Analysis Fertilizers

In 1944, the nitrogen in sodium nitrate cost farmers about 50 per cent more than in ammonium nitrate. In 1945 phosphoric acid in 20 per cent superphosphate cost about a third more per pound than in 47 per cent superphosphate. Potash in 48 per cent muriate of potash cost about

13 per cent more than in that with a 60 per cent content. Chemicals in 3-12-6 complete fertilizer cost about 23 per cent more than those in 5-20-10. *(See Figure 8 and also Appendix, Table A-11.)* These savings are certainly worthy of consideration in making purchases.

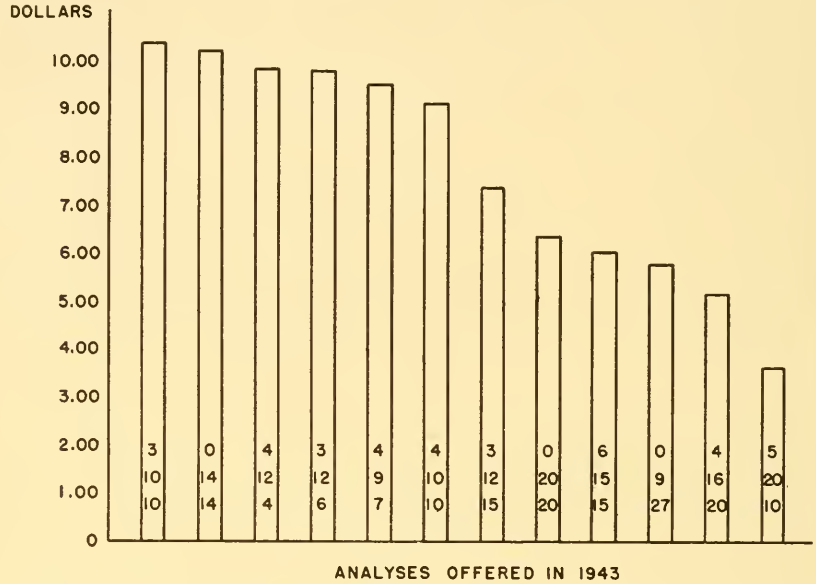

Figure 8.—Amount by which chemicals in a ton of mixed fertilizers exceeds the cost of chemicals purchased separately

PRICES OF MATERIALS AND MIXED FERTILIZERS

Variation of Price Quotations of Different Companies

Prices differ considerably between companies for fertilizers of the same analysis. Thus, opportunities do exist for cash savings in the purchase of the three principal chemicals as such, and in mixed fertilizers. On four mixed fertilizers the maximum differentials averaged better than $5.00 a ton over a five-year period, and on chemicals averaged well over $3.00 a ton. Thus, it appears that farmers can well afford to compare prices and learn where they can buy chemicals for the least money. *(See Table 7 for a more detailed comparison.)*

In 36 comparisons of 176 price quotations covering these seven analyses over the six-year period, it was found that on the average 59 per cent were identical for a given analysis as of a given year. For example, 7-7-7 was quoted at $43.83 by five companies, $43.80 by one, and $46.12 by one. The 5-10-10 analysis was quoted at $43.60 by six companies, $38 by one, and $45.94 by another. After such observations one would tend to conclude that some comapnies had an understanding concerning the quotations to be issued. In any case, it is obvious that farmers can well afford to compare quotations and to determine what savings are possible in making purchases. The savings indicated should repay such effort as might be involved.

Table 7.—Difference between Lowest and Highest Quotations on Selected Fertilizers Southern New Hampshire, 1939-1944

Analyses	No. quot. included	Year	Smallest differential	No. quot. included	Year	Largest differential	Average differential (5 years)
3-12-6	4	1941	0	6	1943	$ 3.31	$1.08
4-16-20	2	1939	$5.97	3	1942	9.60	8.15
5-10-10	4	1941	5.01	4	1940	19.07	7.83
7-7-7	3	1939	2.02	5	1940	6.80	4.27
20% superphosphate	7	1944	1.31	7	1942	6.50	3.96
60 %muriate of potash	3	1939	.45	4	1940	6.35	3.83
16% nitrate of soda	4	1939	0	8	1941	5.42	2.92

* Per ton.

Cost of Chemicals Purchased Separately and in Mixtures

Chemicals will necessarily cost more in fixed fertilizers than when purchased separately, since cost is added when mixing is done. The additional cost of such chemicals varies greatly with the formula. The source of the chemicals and the type of carrier are also factors. If organic materials are used, the cost may be considerably higher. In the

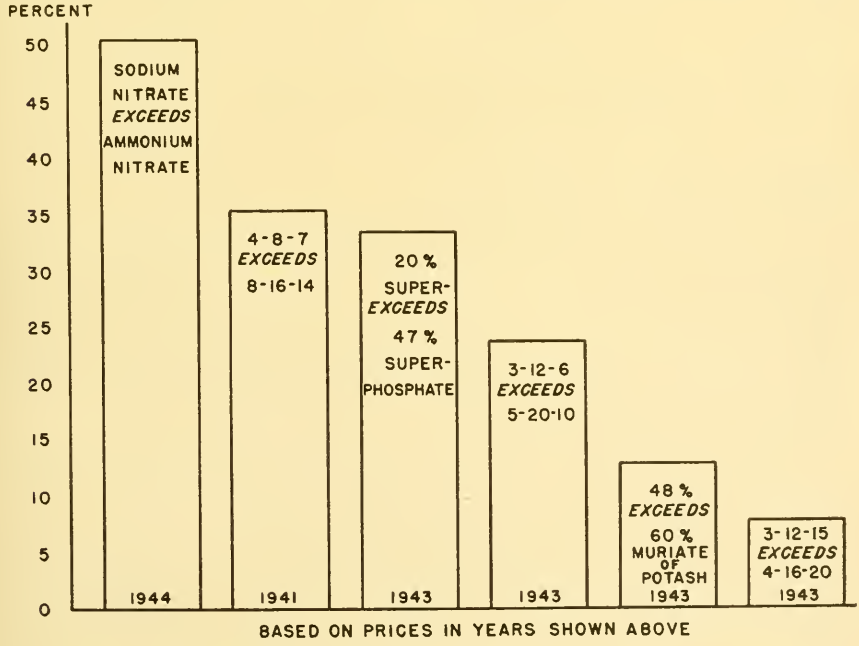

Figure 8a.—Excess costs for chemicals in fertilizers of low analyses

The cost of chemicals in low analysis fertilizers exceeds those in high analysis fertilizers by the percentages shown.

comparisons made here only the quantities of the three principal chemicals are considered.

The chemicals in mixed fertilizers, in 1944, cost from 12 to 63 per cent more than the cost of the same quantities when purchased as 33¼ per cent (average of 32½ and 34 per cent) ammonium nitrate, 60 per cent muriate of potash, and 20 per cent superphosphate. The high-analyses mixed fertilizers of over 25 units cost an average of 23.7 per cent more than when purchased separately, while those in fertilizers of 25 units and under cost an average of 44.3 per cent more. *(See Table 8.)*

Table 8.—Comparison of Cost of Chemicals in Mixed Fertilizers with the Cost of the Same Amount of Chemicals Purchased Separately*

	Southern New Hampshire 1944				
Analysis	No. quotations used in average	Aver. price per ton	Cost of same amount chemicals purchased separately	Additional cost of chemicals purchased in mixed fertilizers dollars	per cent
0-14-14	3	$41.00	$30.66	$10.34	33.7
3-12-6	7	38.87	26.47	12.40	46.8
5-10-10	8	43.55	30.29	13.26	43.8
5-10-5	3	41.25	26.26	14.99	57.1
5-8-7	7	40.45	25.10	15.35	61.2
5-17-0	1	37.60	31.91	5.69	17.8
7-7-7	7	44.15	27.08	17.07	63.
8-8-8	1	40.00	30.94	9.06	29.3
8-16-8	1	47.20	42.01	5.19	12.4
8-16-16	2	56.56	48.46	8.10	16.7

* In form of: ammonium nitrate 33¼ N. (aver.) at $55.80.
60% muriate of potash at $48.37.
20% superphosphate at $27.67.

Prices vs. Freight Differentials on Fertilizers Delivered in New Hampshire

Most fertilizer companies have established two price zones in New Hampshire; one, the seven southern counties; the other, the three northern counties, Coos, Grafton, and Carroll. Presumably, these zones are made as a convenience factor in pricing, and, as a result, some New Hampshire farmers pay less than the freight differentials and others pay more. However, all fertilizer companies do not follow the same practices, nor do they all use the same differentials between southern and northern New Hampshire.

One company uses a smaller zone differential and another quotes on an f.o.b. basis; thus, each farmer would have a differential in accordance with freight rates.

Although the convenience of price zones is apparent, the method of arriving at the differentials is less clear. However, the variation in volume of business in different areas may be one factor. The differential between the fertilizer prices in southern and in northern New Hampshire, in a number of cases, is larger than the actual freight differential. In the example shown in *Table 9* the actual price differential on 5-10-10 for Colebrook ranged from $2.01 a ton more to 65 cents less a ton than the difference in freight costs to Colebrook and Dover. In comparing

Table 9.—Price Differentials and Freight Differentials on One Ton Fertilizer (5-10-10) in Towns in Southern and Northern Zones — New Hampshire, 1944

(A) Dover vs. Colebrook

Company	Price at Dover	Price at Colebrook	Freight rate* to Dover	Freight rate* to Colebrook	Price differential Actual	Price differential if equal to freight	Advantage to Colebrook
A	$36.00**	$37.20**	$2.68	$4.53	$1.20	$1.85	+$ .65
B	43.60	45.85	2.47	4.53	2.25	2.06	— .19
C	45.72	47.58	2.88	4.74	1.86	1.86	0
D	43.60	45.85	2.47	4.53	2.25	2.06	— .19
E	43.60	45.85	3.71	4.74	2.25	1.03	— 2.01

(B) Dover vs. Woodsville

	Dover	Woodsville	Dover	Woodsville	Dover	Woodsville	Advantage to Woodsville
A	$36.00**	$37.20**	$2.68	$3.91	$1.20	$1.23	+$ .03
B	43.60	45.85	2.47	3.71	2.25	1.24	— 1.01
C	45.72	46.96	2.88	4.12	1.24	1.24	0
D	43.60	45.85	2.47	3.91	2.25	1.44	— .81
E	43.60	45.85	3.71	4.12	2.25	.41	— 1.84

** Car door.

* Includes 3% tax.

prices in Dover and in Woodsville, the latter town appeared to be paying somewhat more than the freight differentials for those towns.

Gross Cash Savings in Home Mixing Fertilizers

In the past, at least one company has recommended consideration of the home mixing of fertilizers. It is evident that gross cash savings are possible, but whether or not a net saving results depends on several factors. Among them would be:

(a) Facilities for home mixing
(b) Available time or labor
(c) Alternative uses for labor and whether or not such labor will yield greater returns if applied on other jobs
(d) Effectiveness of the home-mixed product as compared to factory-mixed fertilizers. Some claim it cannot or will not be as well mixed. Yet experimental evidence exists which indicates that it is not difficult to obtain a satisfactory mix.

Table 10.—Cost of Ingredients in Home-Mixed 5-10-5 Fertilizer as Quoted by One Company - 1941

Ingredients	Cost per 100 lbs. when brought in lots of: one bag	one ton
200 lbs. Nitrate of Soda (16% N.)	$ 3.70	$ 3.58
200 lbs. Sulphate of Ammonia (20.5% N.)	4.00	3.74
400 lbs. 44% Soya Bean Meal (7% N.; 2% K.)	7.40	7.20
1000 lbs. Superphosphate (20% P.)	10.00	9.50
150 lbs. Muriate of Potash (60% K.)	3.30	3.14
1950 lbs.	$28.40	$27.16
One ton would cost	29.12	27.86
Commercial mix (100-lb. bag)	$ 1.85	$ 1.79
Home mix (100-lb. bag)	1.46	1.39
Gross savings (per 100-lb. bag)	$ 0.39	$ 0.40
(per ton)	7.80	8.00

Table 11.—Gross Savings in Home-Mixed Over Commercially-Mixed Fertilizers in New Hampshire — 1940 Prices

Analysis	Average price commercially mixed product (per ton)	Number of quotations averaged	Gross savings Dollars per ton	Percentage of price comm. mixed product
5-8-7	$35.60	4	$4.37	12.3
4-8-10	35.47	4	4.27	12.
4-12-4	33.97	2	6.75	19.9
7-6-6	37.66	3	3.33	8.8
5-10-5	35.46	3	6.07	17.1
All above	35.72	16	4.77	13.3

The formula given for mixing a 5-10-5 fertilizer and the cost of ingredients as compared with a factory-mixed product of the same analyses are shown in *Table 10.* Gross savings here amounted to $8.00 a ton. Sixteen other comparisons were made on home-mixed vs. factory-mixed products of the same analyses, using 1940 prices. Gross savings ranged from $1.95 to $7.65 a ton, or from 5.1 per cent to 22.7 per cent of the ready-mixed price. The average gross saving was $4.77 a ton, or 13.3 per cent of the average price for the commercially mixed product.

CASH AND VOLUME DISCOUNTS

Credit vs. Cash Purchases

A large part of the fertilizer is now purchased for cash in New Hampshire. In the case of 76 farmers making purchases in 1940, about 90 per cent were cash purchases. Definitions for cash vary all the way from cash on delivery to 30 days. Ordinarily, 10 days is considered cash, and a few concerns use seven days.

Farmers can make material savings by adhering to the 10-day period. Most fertilizer companies offer 10 per cent from the October 1 time prices when cash is paid within 10 days after date of purchase. Some dealers, however, charge the full price regardless of the time of purchase if cash is not paid. Most fertilizer companies adhere to the time price schedules where payment is not made within 10 days.

A schedule of discounts has been set up by most companies. A man who purchased fertilizer on March 1 and paid for it on April 1 would get a 6 per cent discount from the time price; if on May 1, a 5 per cent discount, and so on.

As in many cases where products are purchased on time, the additional cost represents a very high annual interest rate. Our farmers normally buy a rather small amount of fertilizer before March 1. If purchases of a fertilizer were made on March 1 with a time price of $39.70

Table 12.—Savings Through Cash Payment for Fertilizer

One ton bought March 1-List $39.70	Actual price	Savings if cash is paid March 1 instead of following time payments	Saving over time price if cash is borrowed at 6% and cash price paid
	Dollars		Dollars
Cash within 10 days	$35.73	-	
6% discount April 1	37.32	$1.59	$1.41
5% discount May 1	37.72	1.99	1.63
4% discount June 1	38.11	2.38	18.5
3% discount July 1	38.51	2.78	2.07
2% discount Aug. 1	38.91	3.18	2.29
1% discount Sept. 1	39.30	3.57	2.50
List, or Oct. 1 price	39.70	3.97	2.72

Note: This example illustrates savings per ton which could be made by a person buying fertilizer in March and paying cash within 10 days, or borrowing money from the bank at 6 per cent and paying cash as compared to taking credit for various periods. (Company's price $39.70 a ton on October 1.)

a ton and cash was paid within 10 days, a gross saving of from $1.59 to $3.97 would be made as against taking various amounts of credit up to October 1. Money could be borrowed from the bank at 6 per cent and a net saving of from $1.41 to $2.72 could still be made after covering interest. This would not actually apply in practice where small amounts of money are obtained since many banks have a minimum charge of $1.00 for interest. If such minimum exists, the amount of money borrowed and the time it is used should be given consideration to avoid excessive minimum charge. Credit from the Production Credit Banks should also be given consideration as such loans are particularly suited to farmer's needs.

See *Table 12* for possible savings through avoidance of fertilizer purchases under the usual time schedules. Some fertilizer dealers do give some short-time credit on fertilizers without any apparent credit charge, particularly to good feed customers. However, the farmer cannot expect something for nothing and he should not necessarily conclude that the credit charge has not been added into the prices he pays for goods.

Volume Discounts

The ton price on fertilizers is usually lower than the one-bag price. One company customarily gives the ton price on four bags or more, although, in 1943 and 1944, a full-ton purchase was required to obtain the ton price. In 1942, this discount amounted to an average of $1.50 a ton on seven mixed fertilizers and $2.05 a ton on two chemicals, or a saving of 3.3 per cent and 5.8 per cent respectively. Discounts on ton lots were smaller in 1943 and eliminated in most cases in 1944. *(See Table 13.)*

Table 13.—Volume Discounts on Fertilizers

(One bag vs. ton lots — as given by one company)

Year	Kind fertilizers	No. brands averaged	Average price per bag		Discount for ton lots	
			bag rate	ton rate	dollars per bag	per cent
1942	Mixed	7	$2.279	$2.204	$ .075	3.3
1942	Chemicals	2	1.75	1.648	.102	5.8
1943	Mixed	6	2.183	2.155	.028	1.3
1943	20% superphospate	1	1.30	1.26	.04	3.1
1944	Mixed	5	2.074	2.073	.001	-
1944	Chemicals	2	2.185	2.185	.00	-

Discounts on lots of 10 tons amounted to 5 per cent from the one-ton price. In 1944, this would have amounted to an average of $2.09 a ton on five mixed fertilizers and an average of $1.69 per ton on two chemicals as quoted by one company. A larger discount was offered on straight cars of chemicals. *(See Table 14.)*

Four large fertilizer companies offered consumer discounts ranging from 5 to 10 per cent on lots of 10 tons up, depending on the volume. This represented a maximum of from $2.25 to $4.50 per ton. *(See Table 15.)*

Table 14.—Volume Discounts on Fertilizers in Ton and Car Lots
(As practiced by one company — 1942)

	Savings over the 1-3 bag price:					
	seven mixed		four specials		two chemicals	
Size lots	dollars	per cent	dollars	per cent	dollars	per cent
One ton	$1.50	3.3	$1.73	3.1	$2.05	5.9
10-20 tons	2.00	4.4	2.23	4.	2.05	5.9
20 tons and over	2.00	4.4	2.23	4.	3.05	10.

Fertilizer Delivery Charges

A delivery charge is made for much of the fertilizer delivered to farms. Ten cents a bag for small lots, or $1.00 a ton for larger lots, is a rather common charge. Much depends on the distance hauled, the roads, and the amount delivered.

A farmer who ordered 10 tons might, in many cases, obtain delivery without a specific charge, since it can often be hauled direct from the factory thus avoiding extra handling. Even smaller orders might be hauled from factory to farm where the farmer was located on or near main truck routes. Dealers who haul from the factories in their own trucks receive mileage compensation. One example of such compensation was a range of 50 cents to $3.50 a ton for distances ranging from five to 100 miles.

Savings Through Advance Orders — Car-Door Deliveries

Advance orders and car-door deliveries do not necessarily go hand in hand, but they frequently do so. One farm supply company, which

Table 15.—Consumer Discounts Per Ton on Quantity Purchases of Fertilizers As Given by Four Companies in 1944

	When size of purchase is			
	under 10 tons	10-49 tons	50-99 tons	100 tons and over
When priced at $45.00 a ton or less	0	5%	7%	10%
When priced over $45.00 a ton	0	$2.25	$3.15	$4.50

Table 16.—Cash Savings on 5-10-10 Fertilizers Through Early Orders* and Car Door Delivery

	Price per ton (1944)	Maximum savings in dollars	per cent
Early order (before 2/27/44) and car door delivery	$34.00	3.60	9.4
Early order - warehouse floor	36.40	1.60	4.2
Later order (after 2/27/44) and car door delivery	36.00	2.00	5.3
Later order - warehouse floor	38.00	-	-

* Under war conditions orders are supposed to be placed by October or November.

operates its own fertilizer factory, has attempted to encourage early orders and acceptance of deliveries at car door. An attractive discount was offered on such early orders, and in 1944 and 1945 considerable headway was made in that connection.

Inasmuch as the cash delivered consumer price on this same analysis, as quoted by a number of companies, was $43.60 a ton, and assuming a delivery charge of $1.00, this would give a non-delivered price of $42.60. This would still leave a maximum gross savings of $8.20, or over 19 per cent if advantage were taken of the lowest price.

Table 17.—Possible Gross Savings Through Attention to Methods of Purchasing Fertilizers from One Company

Analysis	Prices per ton when stated conditions were met: Car door Before Feb. 27	Car door After Feb. 27	Warehouse After Feb. 27	Maximum saving: dollars	per cent
5-10-10	$34.40	$36.00	$38.00	3.60	9.5
8-8-8	36.40	38.00	40.00	3.60	9.
8-16-16	47.60	49.20	51.20	3.60	7.
Aver. 3 mixed	39.47	41.07	43.07	3.60	8.4
20% superphosphate	26.80	26.80	28.80	2.00	6.1
60% muriate of potash	44.60	44.60	46.60	2.00	4.3
16% nitrate of soda	38.80	38.80	40.80	2.00	4.9
Aver. 3 chemicals	36.73	36.73	38.73	2.00	5.2

FACTORS FOR CONSIDERATION IN MAKING PURCHASES

Every possibility of making the maximum savings in purchasing fertilizers should be considered. Combine these types of savings which will give the lowest cost and still be practicable under the conditions which must be met.

Check these factors for possible advantages in purchasing:

1. Sources
2. Reliability of product
3. Price quotations
4. Advantages in early ordering
5. Most economical analysis
6. Mixtures vs. chemicals
7. Size of order
8. Delivery direct from plant
9. Car door delivery
10. Credit - sources and cost

These factors have been discussed in preceding paragraphs. They are briefly summarized here:

1. **Source of product.** Determine just what fertilizers are available in the community and the name and location of the concerns handling them. Do not be dependent on one source.

2. **Reliability of product.** Check the guarantees against inspection reports available from your state university or state department of agriculture. Determine which companies are above average in meeting guarantees. In the cases studied, companies ranged on the average from slightly below the chemical guarantees to 9 per cent over guarantees.

3. **Price quotations.** Compare them and show that you are an informed purchaser. You will find considerable variation in prices for some analyses. Average maximum savings (difference between lowest and highest quotations) for a five-year period on seven different popular analyses ranged from about $1.00 to $8.00 per ton.

4. **Early ordering.** Consider available storage on the farm and determine whether early ordering and acceptance of delivery will mean a net saving. Some companies do offer more attractive prices on early orders. One company offered savings of $1.60 per ton on early orders.

5. **Economy in selected analyses.** The cost of the chemicals in different analyses varies considerably. High-analysis products average much lower in cost per unit of chemicals than do low analysis products. (The chemicals in low analysis products averaged 23 per cent higher in price than in high analysis products in 13 cases studied.)

6. **Mixtures vs. chemicals.** Chemicals cost less when purchased separately than in mixtures. (From about $5 to $17 a ton less in case studies where chemicals only were considered.) Consider to what extent straight chemicals can be used and whether any net saving is available in home mixing.

7. **Size of order.** Discounts have commonly been made at the four-bag, ton, 10-ton, and at carlot or higher levels. Savings on volume orders may range from about $1.00 to $4.50 per ton, depending on the amount purchased. Consider possible economies here. This may involve co-operative orders or close co-operation with a specific company.

8. **Delivery direct from plant.** Size of order, time of ordering, and location of farmer and fertilizer plant are all factors which enter into arrangements for direct delivery from plants. Deliveries can often be arranged at no extra charge, particularly for full truck loads. Determine such possibilities before purchase.

9. **Car-door delivery.** Such delivery should be considered as a possible means of cutting costs. The individual farmer will have to determine whether such delivery will make a net savings. It may not be practicable if the purchaser has no truck, but in some cases acceptance of delivery direct from the car may make possible a lower price than when rehandled from the warehouse floor.

10. **Credit - use and sources.** Where credit is essential in fertilizer purchases, bank credit will result in considerable saving over purchases which follow the regular time-price schedules. Savings of from one to three dollars a ton appear as reasonable possibilities. Production Credit associations and private banks are possible sources of such credit.

Prices Received for Farm Products vs. Prices Paid for Fertilizers

In both war periods, prices of farm products advanced more rapidly than did the prices of fertilizers. In this war, fertilizer prices have advanced much more slowly and to a much lesser extent than in the last World War. In the five-year period before this war (1935-1939) farm prices were 107 per cent of the 1910-1914 average and fertilizers were

just 100 per cent of that average. Since that date, however, farm products have advanced much more rapidly.

As of September 15, 1944, fertilizer prices were 121 per cent and prices received by farmers were 192 per cent of the 1910-1914 level.

Fertilizer prices have followed a downward trend over a long period, and this trend may be resumed after the war. Even though fertilizer prices should be relatively less attractive than at present, expansion in use is likely to occur. *(See Figure 9.)*

SUMMARY

1. Fertilizer sales in New Hampshire almost tripled in the 13-year period, 1931-1943.

2. The amount of fertilizer purchased through government agencies exceeded two-thirds of the total sales in the 1942-1943 season.

3. Sales of lime in New Hampshire increased six times in the 10-year period ending in 1942 and have continued to increase since that date.

4. Almost half the mixed fertilizer analyses during a six-year period were sold by only one of a number of companies.

5. The 5-8-7 analysis accounted for the largest sales over a six-year period.

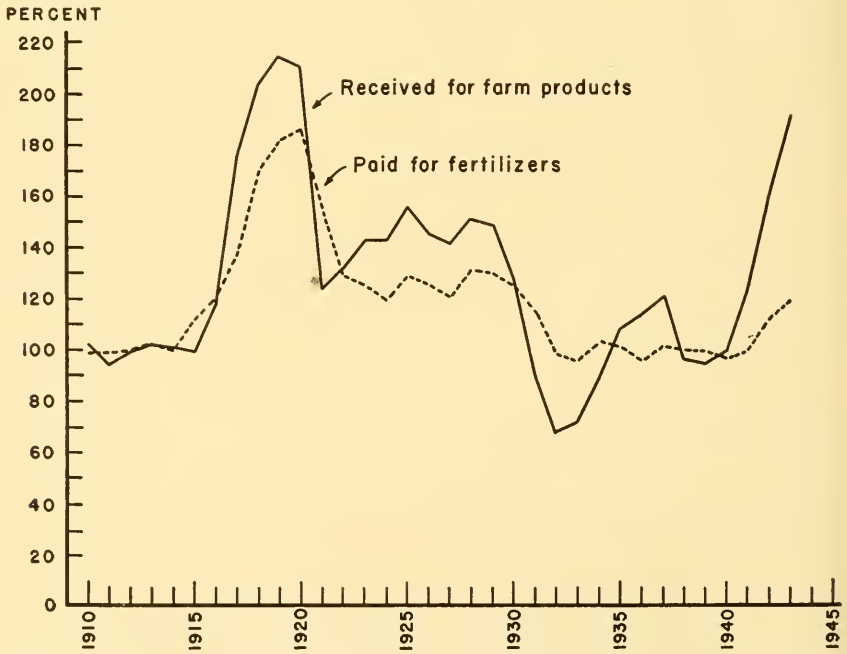

Figure 9.—Index of prices received for farm products and paid for fertilizers by farmers in U. S. (U.S.D.A.) 1910-1914 = 100

6. Twelve analyses accounted for 84 per cent of the total mixed fertilizer sales in the four-year period, 1940-1943.

7. Sixty-eight per cent of the analyses and 76 per cent of the tonnage included analyses with less than 25 units of chemicals in a four-year period.

8. Analysis guarantees of manufacturers have been more than met by complete fertilizers on the average over an eight-year period, but in 46 per cent of 594 inspections guarantees were not fully met.

9. Twelve fertilizer companies gave from 3/10 per cent less to 9.4 per cent more than their guarantees on analyses for which inspections were made in the two-year period ending in 1943.

10. High-analysis fertilizers offer opportunities for large cash savings to farmers, but the majority of farmers do not take advantage of them.

11. Although a number of companies have used identical quotations, price comparisons need to be made to determine possible savings.

12. Two price zones have been established in New Hampshire by most fertilizer companies, but price differentials are not the same for all companies.

13. Home mixing does permit a gross savings ranging from about $2.00 to $8.00 a ton in a number of cases which were checked, but the net savings do not appear great enough to encourage home mixing on any scale.

14. Cash fertilizer purchases permit savings of several dollars a ton from the credit price.

15. Volume discounts are important and justify grouping of orders to get them. They often range from a dollar a ton in small lots to $4.50 a ton on large lots of a carload or more.

16. Delivery charges are usually reasonable and generally range from 5 cents to 10 cents a bag. By arranging purchase in advance large lots can often be delivered direct from factories at considerable saving.

17. Advance orders provide a sound basis for discounts, and savings of over $1.00 a ton were given by one company.

18. A combination of early orders and car-door delivery gave maximum gross savings of $3.60 a ton on purchases from one company.

19. Planning fertilizer purchases well ahead can make possible savings that will pay well for the thought and time involved. Suitable storage facilities are necessary for acceptance of early deliveries.

APPENDIX TABLES

Table A-1.—Sales of Fertilizers and Liming Materials in New Hampshire
(Tons)

Date	Fertilizers	Liming Materials	Date	Fertilizers	Liming Materials
1923	17,000		1934	14,000	2,196
1924	16,000		1935	16,000	2,220
1925	16,000		1936	16,000	5,700
1926	14,680		1937	14,000	16,290
1927	16,875		1938 (A)	13,829*	11,916
1928	16,900		1939 (A)	19,651*	22,438
1929	12,000		1940 (A)	23,375*	25,755
1930	12,000		1941 (A)	25,202*	37,951
1931	10,000	5,500	1942 (A)	28,635*	27,320
1932	11,000	4,100	1943 (A)	28,997*	24,300
1933	12,000	1,500	1944		

* Also includes tonnage distributed by AAA.
(A) Data from private sources (Ford Prince).
Data from AAA (E. P. Robinson).

Table A-2.—Consumption of Mixed Fertilizers and Materials in New Hampshire

Year	Mixed fertilizers	Materials	Total
1939-40	8,314.95	15,321.2	23,636.15
1940-41	8,472.84	16,736.65	25,209.49
1941-42	12,428.	16,209.	28,637.
1942-43	19,633.	9,496.	29,129.

Table A-3.—Per Cent of All Farmers* Receiving Superphosphates Through AAA in All New Hampshire Counties - 1942-1943-1944

County	Per cent all farmers receiving in: 1942	1943	1944**	Average
Belknap	73.	40.6	41.2	51.6
Carroll	73.5	51.2	38.4	54.4
Cheshire	52.2	20.	30.8	34.3
Coos	72.7	38.5	43.1	51.4
Grafton	66.7	45.2	40.4	50.8
Hillsboro	42.4	29.5	36.9	36.3
Merrimack	52.9	28.5	29.8	37.1
Rockingham	55.1	26.6	27.3	36.3
Strafford	46.8	23.9	23.3	31.3
Sullivan	61.	33.7	46.5	47.1
State	56.4	31.8	34.6	40.9

** Estimated.
* Based on number given in 1940 Census.

Table A-4.—Lime Used in New Hampshire 1938-44

Year	From private sources* (tons)	Through AAA (tons)	Total (tons)
1938	10,953	963	11,916
1939	5,653	16,785	22,438
1940	3,182	22,573	25,755
1941	13,609	24,342	37,951
1942	1,417	25,903	27,320
1943	11,024	13,252	24,300
1944	—	34,810	—

* Obtained by subtracting AAA lime from total given in U.S.D.A. Statistical Year Book (except 1941).

Table A-5.—1943 New Hampshire Conservation Program Lime and Superphosphate

County	Number operators		Ave. tons per operator		Total tons	
	Lime	Superphosphate	Lime	Superphosphate	Lime	Superphosphate
Belknap	244	347	2.7	1.3	663	451
Carroll	240	380	2.8	.9	669	334
Cheshire	332	311	3.8	1.1	1276	333
Coos	267	437	4.	1.7	1059	747
Grafton	549	919	3.5	1.5	1895	1364
Hillsboro	729	768	3.6	1.1	2623	875
Merrimack	575	604	2.8	1.1	1635	656
Rockingham	598	795	3.5	1.1	2074	877
Strafford	237	293	3.5	1.1	820	309
Sullivan	180	433	3.	1.4	538	606
State	3,951	5,267	3.3	1.2	13,252	6,552

Table A-6.—Lime Purchases and Amounts Used Per Acre
As reported by certain* N. H. farmers to AAA in 1943
(Three N. H. Counties)

	Coos	Hillsboro	Rockingham	All
Farms reporting	63	69	63	195
Percentage farms using AAA lime	86	71	73	76
Total tons used	439	326	418	1183
Percentage from AAA	66	60	77	68
Average tons per farm	7.	4.7	6.6	6.1
No. farms reporting acres treated	52	61	27	140
Aver. No. acres treated per farm	4.6	3.8	3.7	4.1
Tons used per acre treated	1.3	1.1	1.1	1.2

* Those who took cash in addition to conservation materials from AAA.

Table A-7.—Superphosphate, Potash and 0-14-14 Purchases by Certain* Farmers in Three New Hampshire Counties - 1943

Size of purchases	Figures are percentages of total for each column Superphosphate No. producers	 tonnage	 Potash No. producers	 tonnage	 0-14-14 No. producers	 tonnage
(100 lb. bags)						
1-19 bags	29.7	8.8	52.6	12.2	33.9	12.7
20-39 bags	25.7	18.3	21.1	20.	41.5	34.
40-59 bags	25.2	29.9	15.8	24.9	17.8	24.9
60-79 bags	8.	12.9	5.3	16.	5.9	12.5
80-99 bags	5.7	12.3	—	—	—	—
100 bags and up	5.7	17.8	5.2	26.9	.9	15.9
	100% = 226	100% = 9032	100% = 19	100% = 483	100% = 118	100% = 3763

* From data supplied by state AAA office for those taking cash payments and conservation materials in Rockingham, Hillsboro and Coos counties.

Table A-8.—Fertilizer Analyses Guarantees vs. Inspection Determinations Complete Fertilizers, 1936-1943

(Based on data published in N. H. Agr. Experiment Station annual fertilizer inspection reports)

Company	1. Per cent of analyses of individual companies which met guarantees Rank	 Number Analyses	 Number meeting guarantees (per cent)	Number analyses deficient in one chem. (per cent)	 two chem. (per cent)	 three chem. (per cent)
B	1	39	82.	15.4	—	2.6
E	2	60	78.3	20.	1.7	—
H	3	83	75.9	24.1	—	—
I*	4	12	66.7	33.3	—	—
D	5	59	62.7	25.4	10.2	1.7
G	6	49	46.9	44.9	8.2	—
F	7	70	44.3	35.7	17.1	2.9
C	8	55	45.4	36.4	18.2	—
J**	9	39	38.5	35.9	25.6	—
A	10	128	28.9	48.4	21.1	1.6
		594				
		100	53.5	33.7	11.8	1.

** Companies on which reports were made in but one to four of the eight years.

* Reports for seven years. Companies A to H were included in all eight years.

Table A-9.—Fertilizer Analyses vs. Inspection Determinations Complete Fertilizers — New Hampshire 1942 and 1943

Company	No. analyses included	Percentage by which guarantees were exceeded		
		Nitrogen	Available phos. acid	Water soluble potash
1	21	(— 1.3)	2.8	1.9
2	5	6.5	3.	6.8
3	9	(— .3)	1.5	.6
4	5	(— 1.6)	(— 3.4)	4.
5	11	1.5	4.3	4.1
6	8	1.4	4.6	3.7
7	15	(— .1)	1.6	2.4
8	1	.4	14.3	8.4
9	7	13.1	6.2	(— .2)
10	18	5.8	2.9	5.2
11	2	4.8	.6	8.6
12	1	18.	7.1	2.
All	103	2.1	2.9	3.1

Table A-10.—Chemical Units — Guarantees vs. Determinations Individual Companies — Two Years 1942, 1943, Complete Fertilizers

Company	Number analyses included	Average number units guaranteed	Guarantees exceeded by
A	1	20	9.4%
B	1	21	7.2%
C	7	22.3	5.1%
D	5	20.6	5. %
E	18	20.9	4.3%
F	8	28.1	3.6%
G	11	21.1	3.6%
H	2	19.5	2.5%
I	21	22.3	1.6%
J	15	22.9	1.5%
K	9	23.8	.8%
L	5	23.4	(— .3%)
All	103	22.5	2.8

Table A-11.—Cash Savings Through Purchases of High Analysis Fertilizers — Selected Cases — New Hampshire

Year	Analyses compared		Average cost per ton		Additional cost of low analyses fertilizers to provide amount chemicals in one ton of the high analysis product	
	High	Low	High analysis	For equiv. amt. low analysis		
					Dollars	Per cent
1941	8-16-20	4-8-10	$56.60	$70.10	13.50	23.9
1941	8-16-14	4-8-7	58.64	79.38	20.74	35.4
1941	8-16-20	4-8-10	59.69	76.50	16.81	28.2
1942	20% super	16% super	27.36	28.98	1.62	5.9
1943	0-20-20	0-14-14	48.80	57.90	9.10	18.6
1943	6-15-15	4-10-10	53.24	60.59	7.35	13.8
1943	4-16-20	3-12-15	53.79	58.04	4.25	7.9
1943	5-20-10	3-12-6	51.87	64.20	12.33	23.8
1943	60% M. of P.	50% M. of P.	48.38	52.70	4.32	8.9
1943	47% super	20% super	48.60	64.86	16.36	33.5
1944	8-8-8	7-7-7	42.54	50.69	8.15	19.2
	Amm. nit.	nit. soda	57.60	86.70	29.10	50.5
	60% M. of P.	48% M. of P.	50.13	56.59	6.46	12.9
	All cases				$11.54	22.8%